

An Introduction to Hadza Ecology

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The Hadza (also known as Hadzapi, Tindiga, Kindiga, and Kangeju) are a small group of nomadic hunters and gatherers living in the vicinity of Lake Eyasi, a salt, rift-valley lake not far south of the equator in Tanzania.¹

Their language contains click consonants and several authorities have claimed that it may be related to Bushman languages in southern Africa (for example, Bleek, 1931a, 1931b, 1956; Greenberg, 1950; Westphal, 1956). My own work on the language² suggests that the material put forward as evidence for such a link is unsatisfactory and some research now in progress indicates that Hadza may possibly have distant affinities with languages of the Erythraic (Hamito-Semitic) group (A. N. Tucker, personal communication). Work carried out in 1966 and 1967 with N. A. Barnicot

and F. J. Bennett on Hadza anthropometry and blood-grouping has not yet shown any evidence for a physical link with Bushmen, but only preliminary results are so far available. There is no satisfactory evidence for a cultural tie with Bushmen.

If we treat as Hadza all those who speak the Hadza language as their first language, there are three separate groupings of Hadza. In the tsetse bush to the east of Lake Eyasi, an area of, until recently, well over a thousand square miles, are some four hundred nomadic hunters and gatherers whom I shall refer to as the Eastern Hadza. South of these are more than a hundred settled Hadza who live, and have lived at least since the first Europeans visited the area in the 1890's, by agriculture and by hunting, and who have intermarried intensively with the neighboring Bantu-speaking Isanzu tribe. The third group of Hadza, the great majority of whom live by hunting and gathering, are to be found in the neighborhood of Kimali to the west of Lake Eyasi and number about 250 people. Little contact occurs between the Eastern and the Western Hadza: only very occasionally have individuals moved temporarily or, more rarely, permanently from one of these areas to another. Almost all my field research,³ carried out continuously from 1958 until 1960, and again for short periods in 1961, 1965, 1966, and 1967, was done among the nomadic Eastern Hadza, and in this paper

1. This account consists of a simplified version of part of my unpublished Ph.D. thesis at the University of Cambridge (1964) which is currently being revised for publication. Adequate factual data in support of the argument cannot be presented here but will appear in due course in the monograph.

2. I am preparing material on the language for publication.

3. I would like to thank the following bodies which provided funds for field research: The Royal Society; the World Health Organization; the Wenner-Gren Foundation for Anthropological Research; the East African Institute of Social Research; the Goldsmiths' Company; the Smuts Memorial Fund; the Sir Bartle Frere Fund; the Mary Euphrasia Mosley Fund.

I shall refer almost exclusively to them.⁴

Unlike most other East African hunters and gatherers, the Eastern Hadza are relatively independent of their agricultural and pastoral neighbors. Although they rely on trade and begging to obtain tobacco, cloth, beads, iron, and other goods, they have not entered into an elaborate dependence on, or interdependence with their neighbors. In this respect they stand in marked contrast to the Mbuti Pygmies of the Congo (Turnbull, 1965b and Chapter 15, this volume) and the Kenya Dorobo described by Huntingford (1954).

The small numbers of the Eastern Hadza should not be taken as evidence that they are a broken down remnant of some much larger group. Their numbers have been quite adequate to maintain their language, their culture, and their social organization; there is no evidence to indicate that their numbers were either much greater or much smaller in the past. No very serious epidemic, no large-scale war, no time of famine is remembered.

ENVIRONMENT

The country of the Eastern Hadza, dry, rocky savanna, dominated by thorn scrub and acacia trees and infested with tsetse flies, has been described by a traveler who walked through it in 1921 as "a barren land . . . to all intents and purposes a desert" (Barns, 1923, pp. 71-72). Barren though it may be in places, the country is rich in wild foods. Animals are exceptionally numerous and were certainly even commoner at the beginning of the century. Elephant, rhinoceros, buffalo, giraffe, eland, zebra, wildebeeste, hartebeeste, waterbuck, impala, Thomson's gazelle, warthog, baboon, lion, leopard, and hyena are all common, as are smaller animals such as anteater, porcupine, hare, hyrax, dik-dik, klipspringer, jackal, tortoise, and many others. All of these animals, apart from the elephant, are hunted and eaten by the Hadza. The amount of meat that could be regularly harvested without endangering the future of the game in the area is probably as great or greater than anywhere else in the world where hunters and gatherers live or have lived in the recent past.

Vegetable food—roots, berries, the fruit of

the baobab tree, etc.—though not often obvious to the casual observer, is always abundant even at the height of the dry season in a year of drought. The type of vegetable food available is different in the six-month wet season from the dry season⁵ but there is no period of shortage. The honey and grubs of seven species of wild bee are eaten; supplies of these vary widely from season to season and from year to year.

Sources of water are widely distributed over the country in the wet season but are very few in the dry season. The Hadza consider that about three or four miles is the maximum distance over which water can reasonably be carried and camps are normally sited within a mile of a water source.

Part of the country consists of open grass plains but the Hadza never build camps there. Camps are invariably sited among trees or rocks and, by preference, among both.

SUBSISTENCE

The Eastern Hadza assert no rights over land and its ungarnered resources.⁶ Any individual may live wherever he likes and may hunt animals, collect roots, berries, and honey and draw water anywhere in Hadza country without any sort of restriction. Not only do the Hadza not parcel out their land and its resources among themselves, they do not even seek to restrict the use of the land they occupy to members of their own tribe. For at least the last fifty years outsiders have been steadily encroaching on land traditionally occupied by

4. The ethnographic information given in this paper refers to the position in 1960 at the end of my main period of field research. Recently most of the nomadic Hadza have been encouraged to settle by the Tanzanian government.

5. The rainfall of, on average, 22.61 inches a year (at Yaida) falls almost exclusively during the period December to May with peaks in December and March (East African Meteorological Department—Summary of Rainfall for the Year 1955).

6. Hadza subsistence is described in an ethnographic film, *The Hadza*, produced in 1966. Camera Director: Sean Hudson; Anthropological Director: James Woodburn. (16mm, 40 minutes, black and white with sound.) Copies are available from the author, Department of Anthropology, London School of Economics, Aldwych, London, WC 2, England.

the Hadza, and by eliminating most of the game and destroying much of the vegetation in the areas they have occupied, they have denied the use of most of these areas to Hadza living by their traditional means of subsistence. However, in 1960 the Hadza still had plenty of land and abundant resources.⁷

In spite of the exceptional numbers of game animals in their area, the Hadza rely mainly on wild vegetable matter for their food. Probably as much as 80 per cent of their food by weight is vegetable, while meat and honey together account for the remaining 20 per cent.⁸ In terms of calories, however, meat and honey represent far more than 20 per cent of the total.⁹ Although a large number of species of plant food are eaten, only a few are systematically gathered and provide important quantities of food. The bulk of the vegetable food eaten by the Hadza is in fact obtained from only ten species of plant. The edible part of four of these plants is the root,¹⁰ of five others the berry,¹¹ and of the remaining one its large fruit which contains edible pulp and seeds with edible kernels.¹²

Vegetable food is collected almost every day by the women of the camp who go out as a group or groups with their children. They make their way leisurely to the place where the vegetable food is to be found, which is usually

within an hour's walk of the camp. Whatever the type of vegetable food, a large proportion is eaten where it is gathered. Berries are quickly and easily collected and are eaten raw. Roots are obtained with rather more difficulty; they are dug up with a simple, sharpened wooden digging stick and are, in most cases, lightly roasted on an open fire. Only the food which remains after the women and children have satisfied their hunger is brought back to camp and, even of the food brought back to camp, less than half is given to the men.

Men do not rely on the women to supply them with all the vegetable food that they need. They wander off into the bush individually for a while almost every day to satisfy their hunger. They gather vegetable food only for their own needs and normally bring none back to camp.

Hunting is done exclusively by men and boys and is an essentially individual pursuit. A man hunts only with bow and arrow; no guns, spears, traps, nets, or snares are now in use. Hunting procedure is simple and differs very little whether the target is a lion, a zebra, or a guinea fowl. Once he has sighted his quarry the solitary hunter stalks it slowly and with care until he is, if possible, 25 yards or less away and then attempts a shot. For any animal larger than, say, a jackal, a poisoned arrow will be used. An animal hit with a poisoned arrow will usually be tracked down only after an interval of a couple of hours to allow the poison to kill the animal near the place where it is shot. To track it earlier might cause it to run for many miles before collapsing from the effect of the poison. Occasionally animals are shot at night from hides over water and are tracked the following morning. The large animals which are most frequently killed are impala, zebra, eland, and giraffe.

The men, like the women, satisfy their hunger at the place where food is obtained. A man on his own will normally light a fire, cook, and eat on the spot any small animal he kills, and only after he is satisfied will he bring meat back to camp and, even there, a small animal is as likely to be eaten by the men as by the women and children. Men and women are thus unusually independent of each other in obtaining food. This arrangement has important implications for Hadza social structure

7. A potentially serious situation was developing (Woodburn, 1962), however, in that the annual rate of encroachment had increased enormously as a result of a very large, government-sponsored, tsetse-clearance scheme. If encroachment continued at this rate, serious pressures were likely to develop within a few years. The pressures were eased, though, by the cessation of the clearance scheme in about 1963 and by the settlement of the majority of the Eastern Hadza in 1964 and 1965.

8. These figures are very approximate as they are based on observation but not on measurement. During field work in 1967 detailed measurements will, if possible, be made.

9. The calorific values of Hadza foods are at present under investigation.

10. *Ipomoea transvaalensis* Meeuse, *Coccinea aurantiaca* C. Jeffrey, *Vigna esculenta* (De Wild.) De Wild. ex Th. et H. Dur. and *Vigna macrorhyncha* (Hornem) Milne-Redh.

11. *Cordia ghazaf* Ehrenb, *Salvadora persica* L., *Grewia pachycalyx* K. Schum, *Grewia bicolor* Juss. and *Grewia similis* K. Schum.

12. *Adansonia digitata* (Baobab tree).

which will be discussed in detail in my forthcoming monograph.

Although vegetable foods form the bulk of their diet, the Hadza attach very little value to them. They think of themselves and describe themselves as hunters. From informants' assertions, one would gather that little but meat is eaten. In addition to being the preferred food, meat is also intimately connected with rituals to which Hadza men attach great importance.

Honey, although highly valued as a food, is especially important as a trading commodity. Neighboring tribesmen use honey for making beer and are eager to obtain it in trade.

The foods which Hadza eat, the size and the positioning of their camps, the activities within the camps differ markedly between the dry and wet seasons. These differences are not a simple product of ecological factors. In Hadza culture seasonal polarity is stressed. Activities which are characteristic of the wet season tend to be avoided during the dry season and vice versa. In the wet season the emphasis is on root gathering and hunting small game especially hyrax; in the dry season the emphasis is on gathering berries and hunting large animals. Camps are commonly small and widely dispersed in the wet season, large and concentrated near the few available sources of water in the dry season. In the small camps of the wet season men and women are not segregated to any great extent and live together relatively harmoniously, but in the large camps of the dry season sexually segregated activities (such as gambling) are stressed and the opposition, even hostility, between men as a group and women as a group is reiterated.

EASE OF SUBSISTENCE

Hunting and gathering tribes are often described as living on the verge of starvation. It is easy to gain such an impression after living for a short while with the Hadza; often by nightfall every scrap of food in the camp has been eaten unless a large animal happens to have been killed recently. Moreover the Hadza place such emphasis on meat as proper food and treat vegetable foods as so thoroughly unsatisfactory in comparison that they are apt to

describe themselves as suffering from hunger when they have less meat than they would like. In fact, there is never any general shortage of food even in time of drought. The range of foods in the bush is so great, if one knows what these are and how to obtain them, that if weather conditions should cause the failure of some type of root or berry, or the migration of some of the game, some other type of food is always available. For a Hadza to die of hunger, or even to fail to satisfy his hunger for more than a day or two, is almost inconceivable.

I have already mentioned the exceptional abundance of game animals in this area. Although Hadza, in common probably with all other human societies, do not eat all the types of animal available to them—they reject civet, monitor lizard, snake, terrapin among others—they do eat an unusually wide range of animals including predators such as lion, leopard, serval, wild cat and scavengers such as hyena, jackal, vulture.¹³ With their very powerful bows and their poisoned arrows they are able to kill without any great difficulty all the animals in the area with the sole exception of elephant, which are too large to be killed by the type of poison they use. In spite of the large number of species which they are both able to hunt and regard as edible, the Hadza do not kill very many animals and it is probable that even in the radically reduced area they occupied in 1960 more animals could have been killed of every species without endangering the survival of any species in the area.

The low opinion which Hadza have of the vegetable food which makes up the bulk of their diet is not surprising when its unpalatability is taken into account. Roots are, in general, tough, fibrous, and have little taste; many of the berries are hard and dry and contain large stones which are swallowed whole; *wandushi* berries leave a dry, sticky residuum in the mouth; *k'alahai* berries split the lips and tongue if eaten in quantity. Very little of the vegetable food is eaten with much enthusiasm. But the advantage of vegetable food over meat (or honey), and the basic reason why it constitutes the bulk of the diet of the Hadza, is that

13. Some individuals will not eat some of these animals especially when strangers are present.

it can be obtained quickly and, above all, predictably. When they go out to look for vegetable food, the women can be sure that they will find some type without undue effort. Hunting, even by a highly skilled hunter, on the other hand, is always an unpredictable pursuit and therefore one which is less suitable as a basis for day-to-day subsistence.

With food of some sort always available, the Hadza give little attention to the conservation of their food resources. When women dig up roots, they do not attempt to replace any portion of the plant to grow again. When they gather berries, heavily laden branches are often torn from the trees and carried back to camp. When a woman is building the framework of her grass hut, she is as likely to use branches from berry trees as from any other type of tree that happens to be near at hand. The Hadza may inadvertently assist in propagating berry trees in their locality by their practice of swallowing the berry stones which pass intact through the digestive tract, but they make no deliberate effort to conserve the trees and other food-producing plants.

When a nest of wild bees is found and raided for its honey, no portion of the comb is left to encourage the bees to stay on. Moreover, little effort is made to leave the nest suitable for reoccupation. If the nest is in a hollow tree and the entrance has been cut open with an axe to extract the comb, the hollow will not again be used by bees unless the hole through which the comb has been extracted is partially blocked. When there happens to be a stone of suitable size near at hand, this may be wedged into the hole in the hope that the bees will later return and reoccupy the hollow. As often as not, though, the hole will be left unblocked; people do not feel obliged to attend to this task and do not bother about it unless they can do so very easily.

In hunting no attempt is made at systematic cropping. A man out hunting will shoot any animal he comes across. There are no inhibitions about shooting females (even pregnant females) or immature animals. Adult males are preferred but only because they are generally larger. Hadza do not often kill more animals than they need but this is only because hunting requires effort and they see no virtue in hunting unless they are hungry for meat.

Meat may sometimes be wasted: if a large animal is killed by a man of a small camp, some of the less palatable portions may be left behind for the vultures and hyenas. If two animals are killed on the same day, the more distant one may be abandoned. When tracking an animal wounded by a poisoned arrow, it will commonly be abandoned if it is not found in one day's tracking.

In camp meat is widely distributed and rapidly consumed.¹⁴ The Hadza are familiar with techniques for drying meat in the sun and could, if they wished, preserve stocks for months, at least in the dry season. But in practice meat is rarely preserved: it is eaten in large quantities until it is finished. Meat should be shared with those who ask for it. In particular pregnant women have the right to eat meat belonging to anybody.¹⁵ To eat meat slowly, to preserve it and store it would be largely wasted effort; other people would simply demand meat when their own was finished and it would be wrong to refuse them.

Hunting is not a coordinated activity. Men hunt individually and decide for themselves where and when they will go hunting. When a man goes off into the bush with his bow and arrows, his main interest is usually to satisfy his hunger. Once he has satisfied his hunger by eating berries or by shooting and catching some small animal, he is unlikely to make much effort to shoot a large animal. Of course, if he sees an animal close by which can easily be hunted, he will almost always take the opportunity. Men most often return from the bush empty-handed but with their hunger satisfied.

During the dry season Hadza men spend much more time gambling than hunting. The gambling game, played with bark disks, is a game of chance in which skill plays hardly any part. The most usual and most acceptable stake is a metal-headed arrow, preferably of the poisoned type. In the course of a day arrows (and other possessions which are staked) will change hands hundreds of times. In practice,

14. The system of distribution will be described in my forthcoming monograph.

15. Except for certain portions known as *epeme* meat which are reserved for the initiated men.

the majority of men in dry season camps where gambling is being carried on will often have lost all their metal-headed arrows and will therefore be unable to hunt big game. Arrows without metal heads which are suitable for hunting birds and small animals are not used as gambling stakes. Men are, then, able to satisfy their hunger easily enough during the dry season when gambling is going on, but they spend little time hunting big game due to their lack of suitable arrows or their desire to conserve whatever arrows they possess for gambling purposes.

Many men are, in any case, quite unprepared or unable to hunt big game even when they possess the necessary arrows. Large animals are killed by a small minority of the adult men. Perhaps as many as half of the adult men fail to kill even one large animal a year. The active hunters are usually men in their late teens, or in their twenties or thirties; few men continue to hunt large game actively after the age of 45. There are some men who have killed scarcely a single large animal during their entire adult lives. Whether a man hunts is his own affair. Other men will not put pressure on him. He may, though, find it more difficult to marry a wife, or, once married, to keep a wife, if he is unsuccessful in hunting big game.

In spite of the fact that the Hadza make scarcely any attempt to conserve the food resources of their area, that they rapidly eat all the food which comes into camp without preserving it, that they do not cooperate very much or coordinate their food gathering activities with each other, that they make hunting difficult for themselves by using their arrows for gambling, that a high proportion of men are failures at hunting, they nonetheless obtain sufficient food without undue effort. Over the year as a whole probably an average of less than two hours a day is spent obtaining food.¹⁶ There are seasonal variations and variations from year to year but not very considerable ones.

We have good evidence that the food they eat is adequate nutritionally. In 1960 I was

visited in the field by D. B. Jelliffe and F. J. Bennett of Makerere College Medical School, and they examined 62 Hadza children. According to their report, "the clinical nutritional status of all the children was good by tropical standards; in particular, the syndromes of kwashiorkor and nutritional marasmus, rickets, infantile scurvy, and vitamin B deficiency syndromes were not seen." In 1966 and 1967 Dr. Bennett, this time in cooperation with N. A. Barnicot and myself, did further work on Hadza nutrition. More than 450 Hadza were examined in detail; some of these were resident in settlements, others were still living in the bush by their traditional means of subsistence. The nutritional status of those who were resident in the bush was again found to be good by tropical standards.

My impression is that, over the year as a whole, the Hadza spend less energy (and probably less time) obtaining their subsistence than do neighboring agricultural tribes, but until detailed comparative research is done the matter must remain in doubt. From a nutritional point of view the Hadza again appear to be better off than their agricultural neighbors although to establish this, too, more research is needed. It is clear that agriculturalists are liable to suffer from recurrent famine in this area while hunters and gatherers are not. In the early years of this century, before the colonial government provided effective famine relief measures, numerous Isanzu took to the bush from time to time and lived like the Hadza on bush produce until the famine eased and they were able to return to cultivation. Some stayed on and intermarried with the Hadza. In general the bush plants on which the Hadza mainly rely yield with great regularity; failure is far rarer than it is with vulnerable, introduced cultivated plants such as maize and other cereals grown by neighboring peoples. In comparison with their agricultural neighbors the Hadza are well protected against the dangers of famine. They are doubly protected by the diversity of the food supplies available and by the lesser vulnerability of wild plants to such natural hazards as drought, insects, and birds. Hadza prefer maize and millet meal porridge to their own unappetizing berries and roots but, until the recent settlement schemes were initiated in

16. This figure is a very rough approximation and will probably have to be altered when adequate measurements are made.

1964, they did not in general think these foods were worth all the effort and uncertainty of cultivation.

Perhaps largely because of the temporal priority of hunting and gathering, there has been a widespread tendency to see it as a hard and demanding way of life in which the necessities of the food quest dominate people's lives. With the Hadza this is clearly not the

case and judging from some of the other papers in this volume, they may not be exceptional. I have sought to show that the Hadza meet their nutritional needs easily without much effort, much forethought, much equipment, or much organization. The social implications are important and will be discussed partly in a second paper in this volume and partly in my forthcoming monograph.